Hobbies WEEKLY

January 10th, 1951 Price Fourpence Vol. III No. 2880

CONTENTS

A HOME-MADE FOLDING

WRINGER STAND

ALMOST any type of wringer can be fixed to this stand, and make it more convenient to operate. A far better arrangement than attaching the wringer to a bath, and can do no damage; it is a firmer fitting also. The stand is of the closing variety, and can be folded flat, after use, so occupying little space. The wringer can be left fixed to the stand or removed as preferred.

A side and front elevation are given in Fig. 1. The dimensions will suit, in most cases, a wringer with 12in. rollers; if the rollers are longer, make the length of board (A) longer accordingly. All parts, except the legs, are cut from $\frac{7}{8}$in. deal board.

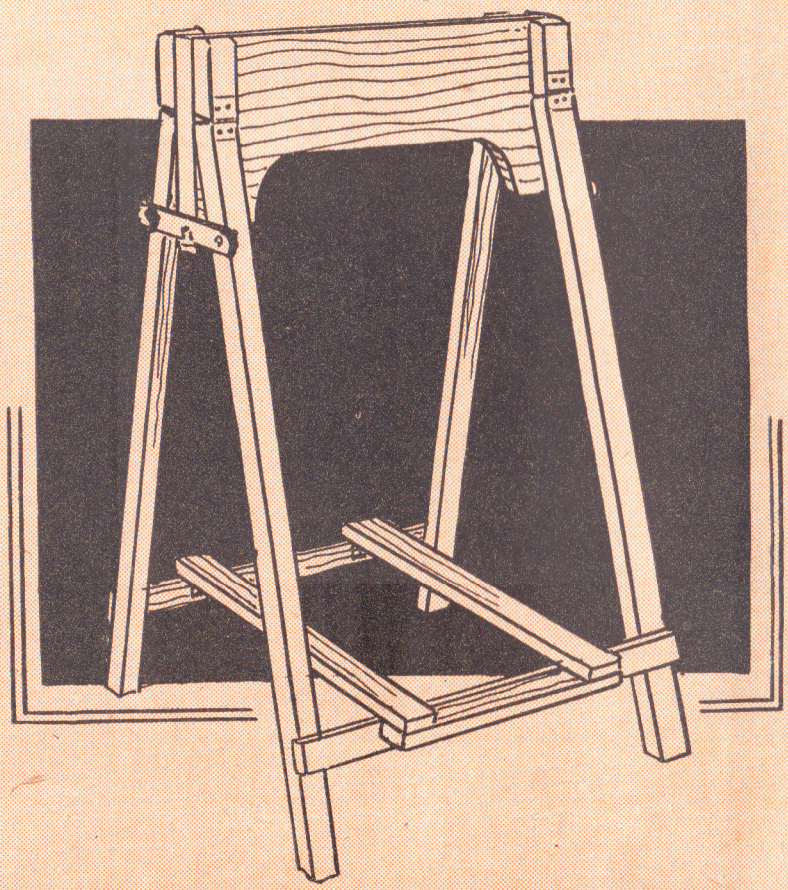
Clamping Board

Cut the top bar (A) to length and width; this is the board the wringer is to be clamped to. A portion of the centre is reduced in width, as shown in the diagram. Cut the four legs from 1in. by 1$\frac{1}{2}$in. wood to the length given and saw across each at 3ins. down from the tops. These short pieces are hinged to the rest of the legs, and then screwed to the ends of bar (A).

Across each pair, at 6ins. from floor level, a 2in. wide bar of wood is nailed, to keep the legs their correct distance apart. It would be as well to fix these crossbars to their respective pair of legs before screwing the upper part of the legs to the top board. The top edges of these, level with the board, are neatly rounded off, or can be bevelled.

Metal Ties

At the ends of board (A) at 1in. from the bottom, drive in a stout 1$\frac{1}{2}$in. round-



headed screw. Do not screw right home but leave enough of the screw sticking out for the metal ties (B) Fig. 2, to slip under. These ties can be made from ⅛in. thick iron bar, about 1in. wide. At the points shown drill three holes, the left side one $\frac{3}{16}$in. and the rest to suit the round-headed screws already mentioned.

Cut the middle and left side holes to form slots. The ties are now fitted

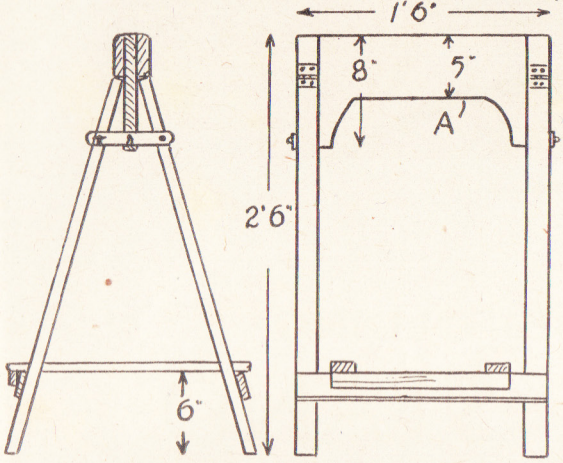


Fig. 1—End and front view of parts

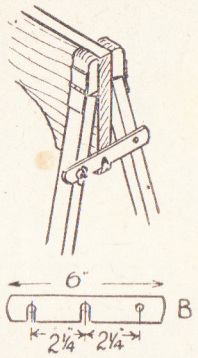


Fig. 2—Fixing details

across the ends of each pair of legs, as in detail sketch, Fig. 2, with a stout round-headed brass screw in the right hand hole.

The middle slot will pass under the screw head in board (A) and the left hand slot under a small $\frac{3}{16}$in. bolt, driven through the leg. To this bolt fit a wing nut for quick adjustment.

With the fitting of these ties, the legs, in the open position, will be held firm enough for the wringer to be operated without the stand wobbling. It will be an improvement, however, here, if the bottoms of the legs are sawn at a suitable angle for them to bed flat to the floor. It is only necessary to loosen the nut of the bolt to allow the ties to be swung upwards, and so release the legs for folding up flat.

For the accommodation of a bath or pail to receive the waste water, two bars of wood are hinged to the rear crossbar of the legs, and rest upon the front one. They are connected together at their fore ends with an underneath bar, this dropping over the crossbar and relieving any strain imposed on the legs while operating the wringer.

Only an approximate length is given for these underbars, as some variation in the estimated stretch of the legs at floor level may be expected. Measure across the actual distance, and allow enough for the bars to extend beyond both rear and front crossbars by just 1in.

The bar that joins this pair of underbars is 12ins. long, and cut from 1in by ⅞in. wood. Fix it so that it drops over the front crossbar snugly. When closing the stand the underbars, of course, can be swung up, and it would be a good idea to prevent them falling forward, to fit a metal button which can be turned to come up against the rear legs when the stand is folded. A rather long button will be needed, or the bars can be spaced further apart so that a short cupboard button will meet the case.

As the stand will have to put up with wet conditions, it will be advisable to give it a coat or two of good paint or varnish. The metal ties should receive a coat of black enamel or something suitable to prevent rust.

WOOD REQUIRED

Bar (A)—1ft. 6ins. by 8ins. by ⅞in.
Legs (4)—2ft. 6ins. by 1½ins. by 1in.
Crossbars (2)—1ft. 6ins. by 2ins. by ⅞in.
Underbars (2)—1ft. 6ins. by 2ins. by ⅞in.
Crossbar for above—1ft. 0ins. by 1in. by ⅞in.

Metal bar—⅛in. by 1in., 1ft.
1½in. iron butt hinges, 2 pairs.

A Craftsman's Notebook

Photo Jottings

AMATEUR photography is already well dealt with in this magazine, but there are one or two jottings from my own experience which I feel like passing on. For instance, when making time exposures without a watch I have found it a successful practice to count out the seconds by saying slowly 'Snapshots one', 'Snapshots two' and so on.

Then I find it handy to have an idea of the length of one's shoe and stride so that short distances can be ascertained fairly accurately by stepping or striding them out.

I always wind on film before closing the camera so there is no chance of the surface touching the bellows and, perhaps, getting marked as it is drawn along. And I make 'winding on' the very first job after making the exposure to make sure it is not forgotten. In case of doubt about a film having been changed, be on the safe side and turn it on, one wasted blank being preferable to a couple of exposures on the same negative.

When loading or unloading film keep it tight on the spool or light may creep in at the edges and cause fogging. I suggest finding a shaded place for this job, but if it must be done in the open, then turn your back to the sun to shield off the bright light.

Talking of sunshine, do not forget to glance at the immediate foreground of the scene to make sure your own shadow, or that of objects behind, is not thrown into the picture.

* * *

Housing the Goldfish

THE present boom in home fish keeping, which is encouraging many newcomers to the hobby, prompts me to mention the subject here. In particular I would stress the importance of providing congenial living quarters.

It is not unusual for beginners, anxious to get started with the most convenient vessel available, to crowd their pets into tall narrow jars, and one can sometimes see such jars standing in full sunshine on window sills outside.

Experience has shown that vessels like this, with small mouths and hardly any room to swim except up and down, are not ideal, and if the occupants do not thrive in such conditions it is because bright and lively fish must have air as well as room. That is why the rectangular tanks, allowing a wide expanse of surface, are the kind chosen by serious aquarists. As regards the number a tank can comfortably accommodate, a good guide is to reckon a gallon of water to each small fish.

Then there is the position of the aquarium to consider, placing it where there is ample daylight without direct sunshine. Large shells, plants, and pebbles are appreciated by the fish because when they wish they may retreat behind them. A sheet of brown paper pasted over the glass nearest the window affords protection from glaring light without excluding it completely.

* * *

A Countryman's Comments

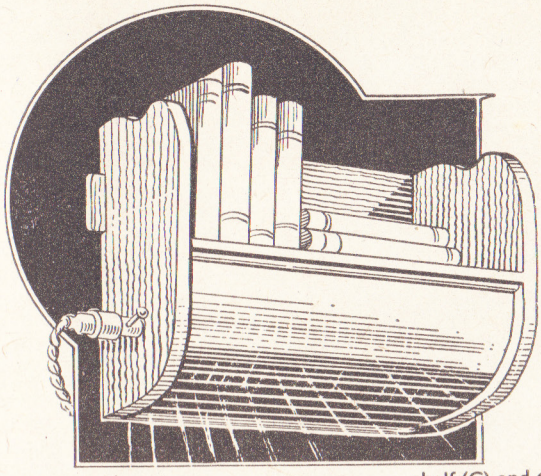
NOTICING a hedgehog in a farmer's kitchen garden I remarked on the usefulness of these creatures in getting rid of pests. Welcome though they may be among the vegetables, however, it seems they also have certain failings. I was informed that a hedgehog will go up to a cow as it lies in the field and drink its milk, leaving little for the surprised owner when he turns up with his pail at milking time.

Moles, which had started throwing up hillocks of fine brown earth in a neighbouring field they recently invaded, were another subject for discussion with the countryman.

The Craftsman

A practical suggestion in wood for a handy

BED LAMP AND SHELF



HERE is a particularly attractive fitment for the bedroom. It is a bed lamp intended to be hung on the wall just above the head of the bed to throw a light for reading. Above the lamp is a useful size shelf for a few favourite but light-weight books.

The electric light bulb is fixed to the left-hand end of the article and the light inside can be switched on and off by the small push rod which stands away just outside the end. The bulb is entirely enclosed to give a soft diffused light, sufficiently bright for reading by.

The Lighting Point

The illustration at Fig. 1 shows the completed article and how it should appear when hung on the wall. It might be mentioned here that a length of flex might be connected to the socket of the lamp and brought down over the bed-head to be finished off here with a pear push so reaching up to switch on and off will be unnecessary.

We recommend oak as being the most appropriate wood from which to make this lamp and rack, but, of course, mahogany would answer equally well; especially if mahogany is the predominant wood used for the bedroom suite.

The ends (A), Fig. 2, will be the first pieces to set out and cut. Two pieces of ⅞in. thick stuff measuring 11ins. by 5ins. will be wanted, and on one of the pieces a series of 1in. squares must be drawn. The curved outline is put in through them, as in Fig. 3. It would be well to add on the piece to the dotted lines which indicate the position of shelf (C) and the back rail (B).

Using a fretsaw, cut round the outline, not forgetting the recess or open mortise in the upper part of the straight back edge. This mortise is to take the end tenon on rail (B), which is again seen in the detail in Fig. 5. When cutting is done, clean up the edges of the wood and bore two holes between the two cross dotted lines to take the screws which hold the shelf (C) secure.

Rail and Shelf

The back rail (B) is 12ins. long, 6¾ins. wide and ⅞in. thick. From the length given, set in ⅞in. from each end to give the width of the tenons. This will leave 10¼ins. as clear width between the shaped ends when the shelf is fixed. Glue the tenons neatly into their recesses and add two countersunk screws in each.

Then cut the shelf (C)—a plain board measuring 10¼ins. by 4⅝ins. See the ends of the shelf are cut to right angles to make a neat and accurate fit with the ends.

Lower Rail

Next prepare the lower rail (D). This will be 10¼ins. long but only 1in. wide. The intervening space between this rail and rail (B) above is filled with a piece of spare thin plywood or ordinary ⅛in. wood, shown as (H) in Fig. 2. It should not be fitted and fixed until all the rest of the work is finished, as it really forms a removable panel for getting to the lamp inside. Otherwise once the curved front is fixed, this back panel will form the only means of access for the renewal of bulb or for repairs. Fix the rail (D) by driving screws through the ends into it the same as the shelf above.

The next pieces to mark out and cut will be (E) and (G). There are two each of these, and they may be of some soft wood if desired, as they really only form a fixing frame to which the curved front and the back panel are fixed. Piece (E), before being cut to shape, should measure 5¾ins. long by about 2ins. wide and ⅜in. thick.

Plastic Front

The curved front stands ⅜in. back from the face of the main end (A), so this curve can easily be set out on a piece of thin paper first with end (A) as a guide.

The back edge of piece (E) is cut away anglewise to allow for room for the electric bulb fitting which is at one end only, of course. Pieces (G) are 4¼ins. long and ½in. wide, and these and the pieces (E) are glued and screwed to the ends as shown in the sectional diagram at Fig. 4.

To form a fixing for the top edge of the curved paper front of the lamp, a strip of small section wood as ⅜in. by ½in. must be fitted between the pieces (E) and glued to the underside of the shelf. The strip is seen as (F), in the section, Fig. 2, and again in the detail, Fig. 6. The latter diagram also shows how the paper is glued to the strip and held securely by a fixing bead nailed on underneath the shelf.

A small wood strip could also be put along and pinned to the rail (D) to hold the parchment paper here securely.

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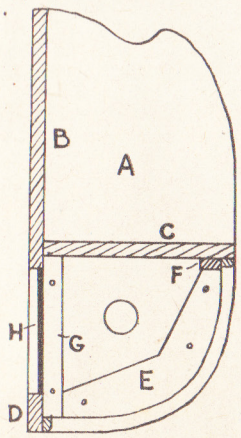


Fig. 2—End section

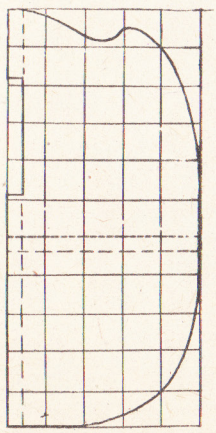


Fig. 3—End shape

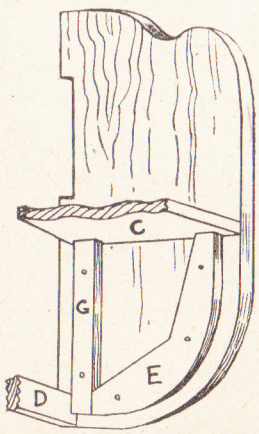


Fig. 4—Interior construction

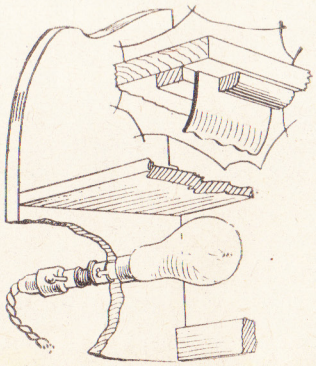


Fig. 6—Light fixing

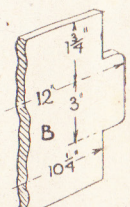


Fig. 5—End tenon and rail dimensions

First class models are obtained by the proper use of 'BRUSH-ON' CELLULOSE

RECENTLY a friend brought the writer an article that he had painted with cellulose, but alas, instead of a nice smooth finish, the surface had all gone wrinkled like a dried and shrunken apple. What had gone wrong? Actually the cause of the failure was simple.

An under-coat of paint had not been quite dry and the solvent in the cellulose had loosened this and then, as cellulose contracts when drying, it had pulled the under-coat and itself into the unsightly ridges.

Some Mistakes

This shows that there is rather more in putting on cellulose than, perhaps, meets the eye. There is no surface so perfect as one given by this kind of paint if properly put on, but it is easy to make mistakes, so let us see what the pitfalls are and how they can be avoided.

From the example of wrinkling just cited, it will be seen that cellulose must be applied to a bone hard and dry surface, for preference one that has never been painted at all. Cellulose gives an exceptionally smooth high gloss of extreme purity and specks of grit, minute hard 'bits' and other substances that should not be there, show up more clearly than they would in an ordinary coat of paint. Scrupulous cleanliness of the surface and brush used is, therefore, absolutely essential.

Frequent Cleaning

As cellulose dries quickly the brush must be cleaned at very frequent intervals, otherwise hard little particles form, and work their way down on to the surface being treated, and to this end a cleaning solution should be prepared and kept to hand. This is made up of equal parts of petrol, methylated spirits and acetone.

This solution, though a cellulose solvent, is for cleaning the brush only and not for thinning purposes. For the latter, Acetone or Amyl Acetate is used alone, Amyl Acetate for preference, as this does not evaporate quite as quickly as Acetone. Thinning *can* be effected with methylated spirits or petrol alone if a little dulling of the surface is not an objection. For the very best results, however, use Acetone or Amyl Acetate without additions.

Perfect cleanliness and smoothness of the surface being worked on is the first essential, then, for good brushing-on cellulose results. Old paint, if necessary, should be removed and the surface taken down to almost a polished finish with very fine glasspaper, completing by a careful rubbing with a soft cloth. The brush, too, should have been put through the cleaning solution and wiped out on a fluffless piece of material.

Cellulose is put on by an entirely different action to ordinary paint. With ordinary pigments only a small amount is taken up on the brush and this is worked in with several strokes over the same area. In cellulose work, however, the brush is entirely immersed in the pigment, so that the bristles are fully loaded and then the area in question is covered as far as possible with one stroke and one stroke only. The next loaded brush should be for an adjoining area.

Quick Application

Cellulose sets quickly, although about one and a half hours is taken for complete hardening. Consequently any attempt to work the surface up after the first application of the brush merely results in the pigment dragging into rolls—which it is impossible to flatten out. Should this by accident occur, it is best to clean off the surface and start again.

If plenty is put on with the first sweep of the brush any faint brush lines can be safely ignored, as these will flow out, merge and disappear before setting takes place, the manufacturers having adjusted the 'viscosity' to a nicety to ensure this.

On account of the characteristics of cellulose it is better never to try a second coat, but to get everything done with the first application.

When using cellulose it must be kept continually stirred. A good stirring should be given to start with and another less vigorous stir at each brushful—this done with the brush itself. This is necessary because the pigments are heavy compared with the solvent, and are always tending to sink towards the bottom of the container.

Incidentally, cellulose never forms a skin as do ordinary paints and this means that it can be readily stored, and, not forming bits within itself, does not at any time require straining before use.

Cellulose applies well to hard, virtually poreless surfaces such as tin, crockery and the like. Woods can be treated, but they require preparation beforehand, especially if of a soft or open-grained nature.

Clean Wood

If the wood has been previously painted and the coat is perfectly hard, it can be used as a base for the new livery. Should there be any doubt, it is better to clean off entirely. This can be done by the usual method of scraper and glasspaper. Any suspicion of varnish must be removed, as varnish always crinkles under cellulose. Varnishes, however, can be softened and wiped right away with a cloth dipped in liquid ammonia.

If the pores in wood are still open, and in every case if new wood is being treated, a coat of 'filler' should be put on before the cellulose. When dry the surface is polished up with fine glasspaper and the work then carried on with.

Most fillers are basically gelatine dissolved in water, and as dampness is the worst possible enemy of cellulose it is essential that any filling coats should have dried out completely before proceeding with the real work.

The Right Atmosphere

Following on the point of cellulose and moisture, cellulose application should never be attempted in a damp atmosphere or when steam or other vapour is hanging about. Conversely, it should not be carried out in a too hot place as this causes inordinately rapid drying and so prevents even running and the flowing out of brush lines. A nice day when it is possible to do without a fire is the very best for the work, though these ideal conditions can seldom be secured.

Finally, it should be remembered that all cellulose is highly inflammable and should never be used near a naked flame.

An interesting use for clear cellulose is to paint over staircase hand rails or other stained surfaces. This has the effect of giving a high gloss finish which shows up the underlying stain in a very nice way. In this case one is just using cellulose in the place of varnish, of course. (333)

Bed Lamp—(*Continued from page* 227)

Stout parchment paper such as is used for lampshades is most suitable in this case, but being of a greasy or oily nature, a few small fret pins should be put in in case the glue does not hold firmly.

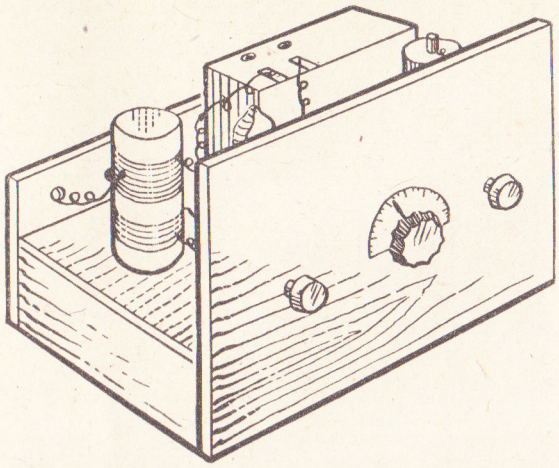
The front fixing bead, however, should greatly reinforce the fixing. In Fig. 6 we include a sectional view, showing how the electric bulb is installed. Assuming the panel (H) has not yet been fixed, the electric bulb socket is fitted to the end upright of the lamp, a hole being previously cut in this piece with the fretsaw to receive it.

Push the lampholder through the hole and screw on the milled-edged metal ring. This will hold the socket rigid and ready for the bulb to be pushed and twisted into place. The wire flex will, of course, have been connected to the lamp holder before this latter is fixed in the wood end of the article. The panel (H) screws on to the two uprights (G) at the ends.

Make all joints secure and thoroughly clean the article before finishing. A chosen art shade of matt paint would look well, or the whole thing may be french polished or wax polished and rubbed up.

The home radio expert can easily make

AN ALL-DRY ONE-VALVER



THIS receiver is compact and efficient, and very economical to run. One of the latest types of midget valves is employed, and this only requires 1·4 volts at ·05 amp. for the filament. No accumulator is required, therefore, and even quite a small dry cell will give a long period of service. This current consumption is about one-sixth of that taken by a small flashlamp bulb, so it will be seen that the drain is very small. Full details of suitable batteries will be found later.

Efficiency is fully up to one-valve standards. With a good aerial and earth, foreign stations can be received with ease. With no earth, and a few yards of flex as a 'throw out' aerial, local stations can be picked up well, so the set will prove quite useful.

Cutting Panel and Chassis

The panel, top of chassis, and strip at the rear are of 3-ply, glasspapered and varnished. The two side runners of the chassis are of ¼in. thick wood, so that the other parts can be secured with small screws or panel-pins without difficulty.

The size of the parts will depend upon the actual components to be employed, or whether size is to be kept to a minimum. If a small tuning condenser is used, a size of 4½ins. by 3½ins. high will be ample for the panel. The piece forming the top of the chassis can be 4½ins. by 3½ins. also, with the side runners 3½ins. by ¾in. The whole set, including batteries, will then be approximately 4½ins. wide by 3½ins. high by 3¾ins. deep.

If there is any doubt about the components being accommodated in this size, dimensions may be increased. If minimum size is required, however, and midget components and batteries used, a rather smaller size will be possible. By standing the parts in the positions shown in Fig. 3. the size required will soon be seen.

Circuit and Coil

Fig. 1 shows the circuit, the valve being a 1S5 glass button-base diode-pentode. (The diode is not used). Various aerial tappings have been provided so that best results can be obtained with a variety of aerials, and the coil is shown in Fig. 2. A 1¼in. diameter tube is used, and 32 S.W.G. enamelled wire. (If other sizes of former or wire are used, the number of turns may need slight modification).

Anchor the wire through two small holes, forming end (A). Wind on twenty turns, side by side, and form a small loop by passing the wire through two small holes, to form tapping (B). Continue for twenty more turns, then form loop (C) in the same way. Put on twenty further turns, forming loop (D). To finish off this winding, put on twenty-four turns, ending at (E).

The reaction winding is commenced ⅛in. below the grid winding, and consists of 60 turns, side by side. All turns throughout both windings must be in the same direction, as shown. The coil is mounted by pushing it on a small strip of wood which has been screwed to the chassis.

Fig. 3 shows the wiring on top of the chassis. (The batteries should be left off for the time being). A few leads pass down through the chassis. One goes from the switch to the positive filament tag of the valveholder. A second goes from the negative phone terminal to the H.F. choke. Further leads go from the moving and fixed plates terminals or tags of the tuning condenser to earth line and ·0003 mfd. fixed condenser respectively. A lead goes from (G) on the coil to the valveholder anode, and from H.T. positive to the positive phone terminal.

If the ends of the coil windings are left long enough, these can go directly to the various parts. For the other leads, thin flex can be used, or solid insulated wire.

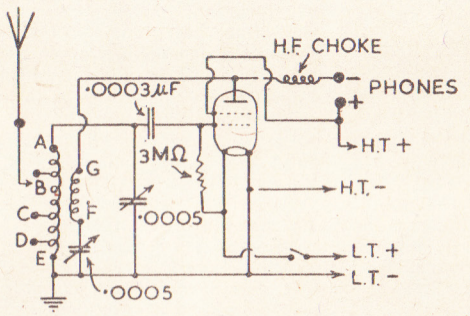


Fig. 1—The theoretical circuit

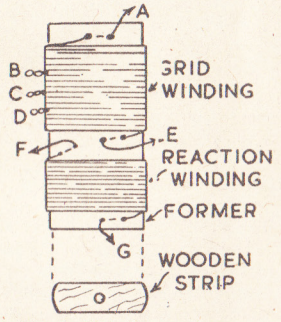


Fig. 2—Winding tuning coil

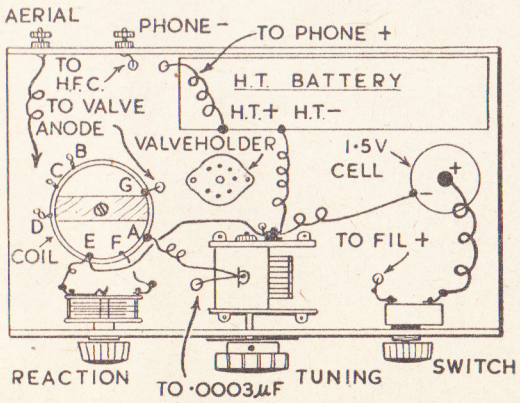


Fig. 3—Chassis lay-out of receiver

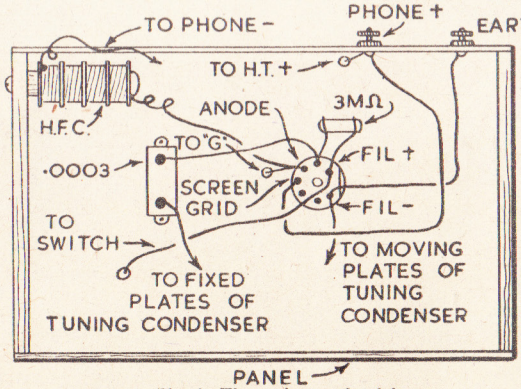


Fig. 4—The underneath wiring

Fig. 4 shows the remaining connections underneath the chassis. The valve should not be inserted until after soldering to the holder is completed; with a fairly hot iron, and cored solder, this can be accomplished with ease.

A small H.F. choke is screwed to one runner. This part can be made by taking a piece of wood 1¾ins. long and ⅜in. in diameter and gluing five cardboard washers on it, as in Fig. 4. Wind the spaces *full* of *thin* insulated wire (about 36 S.W.G. or finer). There should be at least 150 turns in each space, if possible. The choke can be attached to the runner by means of a screw, and its ends taken to phone negative and valveholder anode tag.

The Batteries

On no account apply more than 1·5 volts to the valve filament. This can be obtained from a single dry cell, the carbon rod being positive.

For high tension, one of the small H.T. batteries (these are about 2½ins. by 1in. by 3¾ins.) can be used. Do not allow its tags to touch other leads or metal parts in the set. Alternatively, as the set will work well with a low voltage, this battery can be made up in a variety of ways. Two or three 9 volt grid bias batteries in series can be used, or it is quite feasible to solder up a small battery from small torch-lamp cells. A battery of 30 to 45 volts will do well. More than 67½ volts should not be used with this valve type. The H.T. voltage will to some extent govern volume, which will be reduced with very low voltages (say, under 20 or so).

Cardboard may be packed round the batteries to hold them in position. As only one valve is used, the H.T. battery will deteriorate more from age than because of the current taken and a new battery in good condition should be expected to last a minimum of six months. Grid bias batteries, having larger cells, may last a year or more, according to use.

The farther towards end (E) on the coil the aerial lead is taken, the sharper will tuning become. But volume will be somewhat reduced, so that, with a small aerial, points (A) or (B) will be best. With a long or outdoor aerial, points (C) and (D) can be tried.

The reaction control should build up volume until oscillation commences. If it does not, the coil has not been made correctly, or the battery voltages are too low. The reaction winding has been given for best average conditions. If a battery of 60 volts or so is used, reaction will be a trifle fierce. This can be cured by removing turns from the reaction winding. With extremely low H.T. voltages (and results can be obtained with a single 9 volt battery) reaction will be weak. This can be overcome by placing the reaction winding as near the grid winding as possible, and by increasing the number of turns up to 75.

The aerial, and tapping to which it is taken, will also influence reaction, but normally good results may be expected at once, as these points are not critical.

Full size patterns on page 239 for this comic policeman

KITCHEN REMINDER

FULL-SIZE patterns will be found in this issue on page 239 for making the amusing little kitchen accessory shown here. It is the type of work that even the beginner with the fretsaw may tackle with confidence, whilst the more expert will quickly see that a batch could be easily and cheaply made up, and find a ready sale by reason of their novelty and universal use. The policeman's moving arm is used to indicate one of the five articles printed on the bottom of his coat, or the pad, on which less-frequently required oddments can be jotted down.

Cutting Out

Paste the patterns on to a suitable piece of wood, and when the paste is dry, cut round each with the fretsaw. Drill the holes in movable arm and body. Then clean off the pattern and finish each piece with glasspaper. The letters forming the word 'Stop' should receive extra care, to ensure a neat finish to the job. If it is likely that more than one Reminder will be made, then the pattern will, of course, be traced, and the original kept for further use.

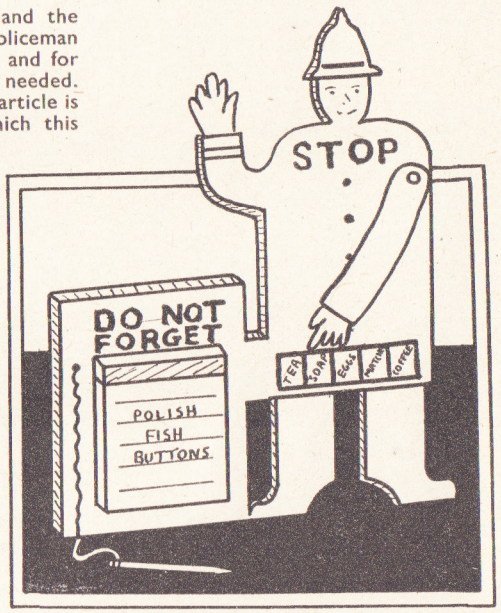
Painting

The painting is best done before assembling the parts. Any available colours may be used, but blue, white and black enamels are probably most in keeping with the subject. Enamel the letters, gloves, buttons and face white, with a white strip on one arm for the removable armlet (our policemen being always ready for duty!). The uniform and the board holding the scribbling pad can be blue, and the boots and lines of expression on the face, black.

The words 'Do not forget' and the five items in the panels on the policeman himself are best done in white, and for these a small camel hair brush is needed. A great deal of the finish of the article is determined by the way in which this lettering and the lines are done, so it is worth while to do it as carefully and neatly as possible.

When all the colours are dry, glue the 'Stop' letters into position. They need to be positioned very carefully, so that they do not restrict the movement of the arm, when this is added. The arm is fixed to the body with a nut and bolt, which should be loose enough to allow the arm to be moved, but tight enough to hold it in any position that it is wanted.

It is a good plan to screw a second nut on top of the first, when the required degree of tightness is obtained, as this prevents it from working looser with the movement of the arm. When not in use the arm can be pushed away from the five inscriptions. Choose these five names very carefully—they should be five that are frequently required, to avoid the use of the pad as much as possible.



The Pad

A small scribbling pad can be bought quite cheaply from a stationer. In order to have it of just the right size it is usually necessary to buy the nearest size above and trim it down with razor blade and straight-edge, before gluing its back card to the board.

Finishing Off

A strut for gluing on to the back of the model is given, and where there are facilities for the Reminder to stand up in a conspicuous place, this is probably best; but instead of the strut, a piece of string can be threaded through a hole drilled near the top, for hanging it up, if this is preferred.

Finish off by cutting a small piece of pencil and attaching it by string from the pad-board. (330)

The railway modeller should understand the dimensions of

O AND OO GAUGE SIZES

WHEN making model railway vehicles to run on the two popular 'table top' gauges of the present time, viz., O and OO, the point of correct dimensions invariably arises. Curiously these are not often set out and the question of just how high this van should be or how wide that truck can become quite a poser.

If taking measurements from existing tinplate toys a danger lies in the fact that

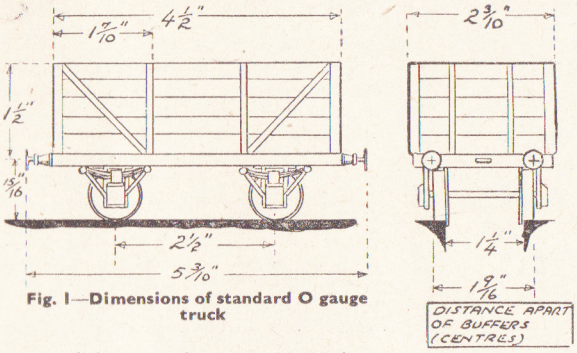


Fig. 1—Dimensions of standard O gauge truck

many of these are by no means scale or anywhere near and consequently one may start off on a series of vehicles that are much too small or equally too large.

There is, of course, some latitude both sides of what one might call standard dimensions, for in actual practice vehicles running over different routes are often of varying maximum heights and widths.

Coach Variation

Thus, coaches on some lines can touch on nearly 13ft. high, while in others 12ft. is the limit. As a compromise one of our big groups has taken 12ft. 6ins. for all its new rolling stock. Another example of variation is that the old G.W.R. on its West of England route can and does run coaches about 6ins. wider than the average in other parts of the country.

Let us deal, however, with average dimensions and see how they work out for gauge O—that is for trains with a distance between the rails of 1¼ins.

Fig. 1 shows a standard open truck. Open trucks are all of the same width, but they vary in side height, from the type shown to the coke truck in which the sides are taken up to about van height. In this respect of side height, the particular vehicle being copied must be closely studied.

If taking dimensions from a full-size drawing it should be noted that the scale is 7 millimetres to 1ft., which means that if we multiply any full-size dimension in inches by 5/226 we get at once the gauge O dimension in inches.

The most important dimensions to bear in mind are the width between the buffer heads, the height of the buffer centres from rail-level and the full width of the trucks' underframe. These should be the same in all vehicles. Other dimensions, some definitely different kind. Thus flat rail-trucks and timber trucks can be longer than usual—but for open trucks to look well, keep them to virtually the same 'wheel-base'.

Note that in the gauge O diagram (Fig. 3) the height of a van is given as 3¼ins. This works out to a shade under 12ft. 3ins. in real practice, which is the height of the average van we see about. Make this as a standard for your vans and you will not be far out.

The average 'close' bridge height incidentally, can be taken as ¼in. above this, i.e., 3¾ins. But this will be dealt with later.

Standard Wheelbase

The wheelbase (i.e., the distance between where the wheels touch the rails) of our standard vehicle can be accepted as 2½ins., the overall length as 5 3/10ins., width of body 2 3/10ins. and that of the underframe, which is slightly less, as 2⅕ins. The height of the buffer centre-line from rail level scales out for gauge O as 15/16in. and this must be retained for all rolling stock. The axle-guard measurements are not given, as these, with the

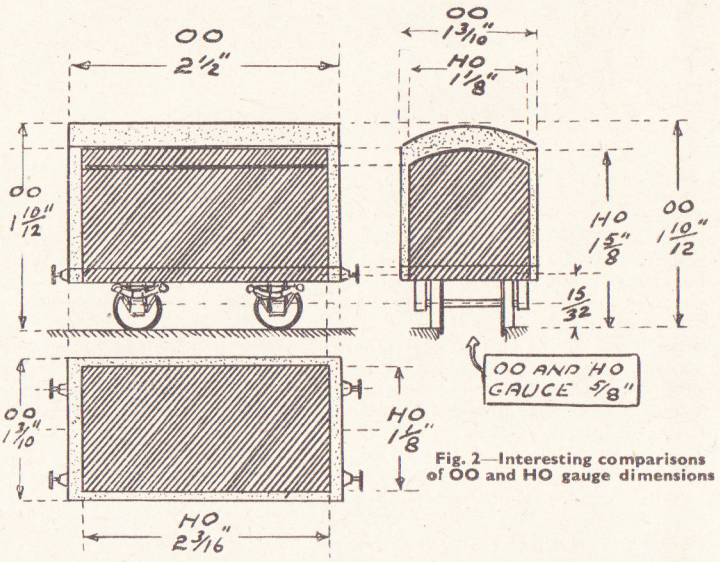


Fig. 2—Interesting comparisons of OO and HO gauge dimensions

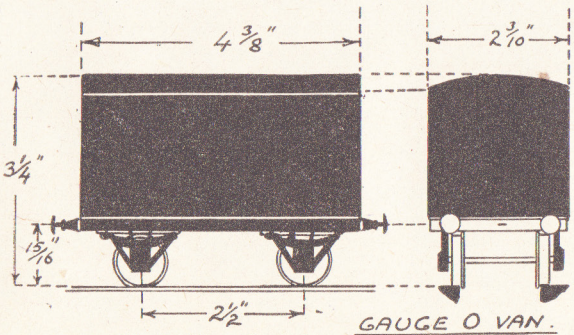


Fig. 3—Dimensions of a gauge O van

although they should tone, can to a certain extent be varied.

For appearance sake, too, the distance between the axles in various open trucks you make should be fairly standard. Differences do exist in practice, but a too short or too long truck never looks well on a model train, unless it is of wheels, are generally bought, but the width of the dummy spring is 1 1/10ins. and the depth ⅛in. The metal strapping on the side of a truck is spaced, as shown, and normally the planking is, as indicated.

Now when we come to ⅝in. gauge stock (Fig. 2), we run up against rather a difficulty, as here there are two standards recognised by the model fraternity, the one going by the name of OO and the other HO. In general conversation the term 'OO' often covers both, but there are two distinct scales.

HO is the true 'scale model' size and uses 3½mm. to 1ft. OO employs 4mm. to

(*Continued foot of page 232*)

The home handyman can easily make for himself

A PACKING CASE BENCH

THIS is a design which should commend itself to readers living in flats or small houses where the lack of a bench makes the hobby of model engineering a difficult if not impossible proceeding.

The bench has been developed with a view to reaching a compromise between the conflicting requirements of portability, ease of storage and utility for the purpose in mind. While it is hardly suitable for use in connection with the construction of larger models, it has been found to be eminently suitable for the construction of small model locomotives and model ships of sizes ranging up to about 24ins. overall length.

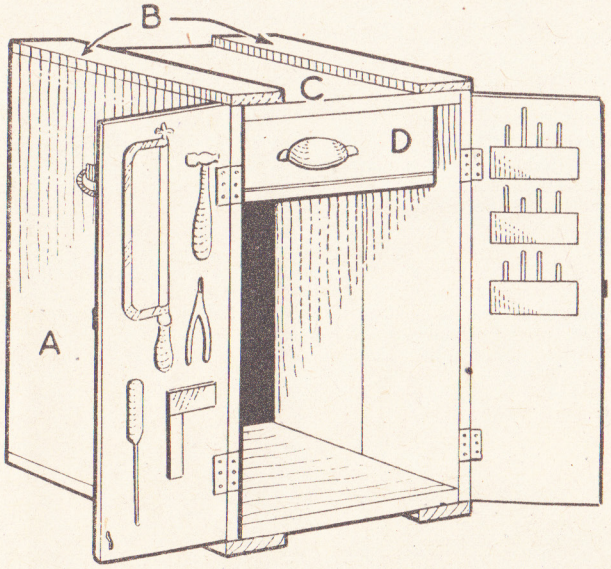
It will, of course, be necessary to have any turning work done elsewhere, as the fitting of even the smallest lathe to a bench of this type is seldom satisfactory. This is unlikely to give rise to any practical difficulty, however, as a large variety of finished or semi-finished turnings are now available at fairly reasonable prices.

As will be seen from the accompanying sketch, the bench is fashioned from a packing-case of suitable dimensions and should be provided with a pair of doors. These are best made from oak or other similar hardwood. The dimensions mentioned are those applicable to the prototype model but will, in fact, depend on the size of the packing-case chosen for the construction.

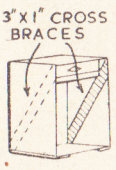
If it should be felt necessary to strengthen the packing-case, this may be done quite effectively by fitting the cross braces, as shown in the small sketch. The braces can be made from 3ins. by 1in. stuff and secured by half-a-dozen good, screws on each brace.

The 4in. deep drawer and support may be made of any suitable scrap wood and provides a useful receptacle for the storage of such items as small tools component parts, nuts, bolts and screws and so on.

It is important, however, to bear in mind that the drawer and support should be set back in the tool chest by about 2ins., so the doors may close flush when the tool-racks are fitted in position and filled with tools.



The carcase (A) shown is 28ins. by 14ins. by 14ins., with top battens (B), space for vice (C) and a 4in. drawer (D). The detail shows the 3in. by 1in. cross braces



The Doors

The doors are simple enough to make and might consist of single planks, if well seasoned timber is available. If there is any doubt as to the seasoning of the timber in the wider planks, the doors are best made by battening a number of narrower planks together.

The tool-racks are made from scraps of wood and call for little description save to say that the drill and tap racks are made by drilling out the blocks to accommodate the small tools. The larger tools may be secured either with wooden supports or with the spring steel tool-clips which are obtainable from Hobbies. The precise location of the racks will depend on personal choice.

In Use

In use, the doors are opened to enable the user to sit at the front of the bench with one or both feet on the solid base of the tool-chest. This steadies the bench and makes for greater comfort when sitting at work. It may be found strange at first to sit while filing and carrying out the normal processes employed by the model maker, but the strangeness soon disappears as the bench is used.

Minor fittings such as door fastenings, hinges and carrying handles are shown in the sketch and may be modified to suit individual requirements.

Model Railway—(*Continued from page 231*)

1ft. and so is slightly outsized, giving vehicles which are just a little longer, higher and wider than scale. This variance came about in the early days of the tiny gauge when manufacturers had not the least conception of what a vast and mechanically keen following it would eventually get. 4mm. to 1ft. was convenient and rolling stock constructed to this looked scale, so this ratio was accepted.

But this miniature of miniatures caught on, and becoming the accepted standard for many really enthusiastic workers, it was not long before the 'half millimetre out' was spotted, and to meet public demand, model engineering firms had to start turning out true scale-model items.

HO is really better from the modeller's point of view, as it is exactly one half of gauge O, and with gauge O measurements to hand, we simply have to divide by two to get those of HO. If working from full-size dimensions, multiplying these (reduced to inches) by the fraction 5/452, we get at once the corresponding HO in inches.

Should your stock already be to the OO scale and you decide to construct your other equipment to this, it is really best to bring all the dimensions down from the full-size by using the 4mm. to 1ft. reduction, as there is no comfortable way of scaling from gauge O. If, however, the HO dimensions are to hand, multiplying by $1\frac{1}{7}$ (i.e., 8/7) will give the OO equivalents quite readily.

The diagram with this article gives the most used dimensions for the $\frac{5}{8}$in. gauge, and if kept to hand, will be there for continual reference. It is, however, well to keep the five main conversion rules in mind, viz.:—

(1) From gauge O to HO divide by 2.
(2) From HO to OO multiply by $1\frac{1}{7}$ (i.e., 8/7).
(3) From OO to HO multiply by 7/8.
(4) From full-size to gauge O multiply by 5/226.
(5) From full-size to HO multiply by 5/452.

(to be continued)

Novel and surprising results from experiments in

HOME CHEMISTRY

Lead Acetate

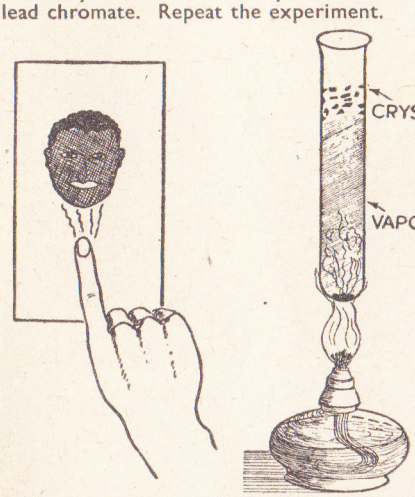
SACCHARUM plumbi quintes-sentiale—that was the mouthful the old alchemists had to use when they spoke of lead acetate! Before one could do much experimenting in those far-off times, one had to be pretty good at Latin!

The preparation of lead acetate was first mentioned as far back as the fifteenth century by the alchemist Basil Valentine, who (being translated!) said: 'Mark that pure distilled acetic acid poured on powdered saturnum (lead oxide) and warmed in the water-bath entirely loses its acid and becomes sweet like sugar'.

Thus it is from the old alchemical name that lead acetate is still referred to in commerce as sugar of lead. These days we take the sweetness on trust, for we know lead acetate to be very poisonous!

Useful Pigments

From lead acetate we can make two useful pigments; chrome yellow and chrome red. Add to lead acetate solution potassium chromate solution. A splendid yellow precipitate will fall. This is chrome yellow and chemically known as lead chromate. Repeat the experiment.



Turning white into black — Subliming iodine

Then add sodium hydroxide solution and boil. The yellow deepens to a fiery orange-red. This is basic lead chromate or chrome red.

Both of these make good water colour paints. Filter off the precipitates and wash them several times on the filter with the wash bottle or by adding a test tube full of water each time. Let them drain, then lift out the cones of filter paper, put them in evaporating dishes and dry the precipitates in the oven.

Then carefully powder them on watch glasses with a glass rod and mix them to a paste with glycerine. If you now get out your paint brush and use the colours in the usual way, you will find what vivid and pleasing tints they give.

We all know, of course, that other valuable pigment, white lead. It is a basic carbonate of lead and is manufactured by exposing metallic lead for some weeks to the action of vinegar fumes and fermenting spent tan bark from leather tanneries. We can make a form of it in an instant by mixing lead acetate and sodium carbonate solutions.

If you filter and wash the precipitate, dry it and grind with linseed oil and turpentine, you will find it makes a passable white paint, though its covering power is not so good as that of commercial white lead.

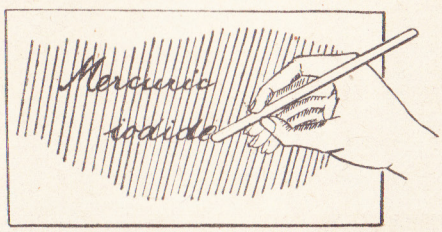
Though white lead paint is unsurpassed for covering power, it has the disadvantage of darkening in the sulphur-laden air of towns owing to the formation of lead sulphide. Smear some precipitated white lead on paper and hold under it the cork from the ammonium sulphide bottle. It instantly becomes brown.

An Amusing Trick

This reaction may be used for an amusing conjuring trick. You show a friend a drawing of a white man's face and calmly propose to turn him into a negro. On passing your finger below it, hey presto! the miracle is accomplished!

To prepare the drawing for this, make the outlines in pencil. Then mix some precipitated white lead with water containing a little glycerine to keep the final drawing slightly moist.

Paint in all the parts of the head which should become black, leaving the lips and whites of the eyes untouched. When the painting is dry, you only need to moisten the tip of your finger with ammonium sulphide to perform the trick.



Writing with a glass rod

Lead sulphate, another white salt of this metal, is also used in paint making, as well as in the pottery industry. Sulphuric acid or any soluble sulphate precipitates it when added to lead acetate. It has a curious property.

If you make a 'sandwich' of a paste of lead sulphate and water between two small sheets of zinc and immerse it in common salt solution for about ten days, the lead sulphate is converted into a mass of spongy lead. This spongy lead may be used for taking impressions. Try pressing a coin into it and you will find a perfect mould in reverse.

Crystallisation

One of the most beautiful experiments in crystallisation may be done with lead iodide. This yellow salt of lead is precipitated on mixing solutions of lead acetate and potassium iodide.

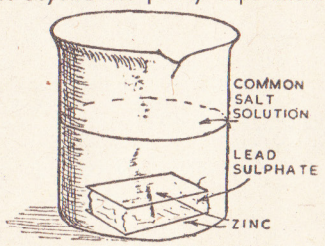
By adding water and boiling, the lead iodide dissolves to a colourless solution. As the solution cools, golden spangles scintillate in the liquid as the lead iodide crystallises out. If the cooling solution is viewed in the sunlight, the beauty is much enhanced. This experiment has been justly called 'the golden shower'.

A 'silver shower' may be produced in the same way with lead chloride, which is, of course, made by mixing solutions of sodium chloride and lead acetate.

Potassium Iodide

POTASSIUM iodide is not one of the cheapest of the home chemist's reagents, but if used in quantities of a gram or two for each of the following experiments, no serious inroad will be made on the pocket.

Our main uses for this reagent, of course, are in the testing for silver, lead and mercury in solution and for acetone and alcohol. The yellow precipitates of silver and lead iodide present little interest beyond the pretty experiment of dissolving lead iodide in hot water and watching the golden shower of the crystals as they form in the cooling solution. But mercuric iodide gives us two interesting experiments.



Spongy lead for models

Add potassium iodide to mercuric chloride. A yellow precipitate forms which quickly changes to scarlet. Wash it by decantation several times until the wash water no longer gives a white precipitate of silver chloride with silver nitrate. Filter off half of the precipitate and dry it in the oven.

Crush it finely and smear some evenly on a slip of paper. Hold the paper a few inches over a flame. It instantly changes from scarlet to yellow.

Now take a glass rod and write with it on the yellow surface. Your writing will appear in startling scarlet letters on the yellow background. As may be imagined, this makes a surprising piece of chemical magic for those no-chemist friends who visit your laboratory bench and ask you to 'do something'. It never fails to impress!

To the other half of the precipitate add potassium iodide drop by drop. The precipitate dissolves and if you evaporate the solution you will be rewarded with yellow crystals of the uncommon double salt, potassium mercuric iodide.

Potassium iodide gives us an easy source of the element iodine. Generate chlorine from bleaching powder and hydrochloric acid and bubble the gas through potassium iodide. As each bubble moves up through the solution, a cloud of iodine forms and settles to the bottom as a crystalline heavy black powder. When no more iodine forms, wash it a few times by decantation.

Purified Iodine

Iodine is further purified by sublimation, but on a small scale this is not to be recommended, as it must first be dried and drying involves considerable loss owing to the very volatile nature of the element. It is better kept in the sludgy state in a glass stoppered bottle, for iodine vapour rots cork.

You can examine the ready volatility of iodine by taking some of the sludge on the end of a wood or horn spatula, pressing it as dry as possible between filter paper and warming it gently in a dry test tube. A magnificent violet vapour arises and condenses in black scales on the cooler parts of the tube.

This iodine sludge is useful for preparing hydriodic acid, and solutions of the acid containing up to 50 per cent of the acid may be obtained by the following method.

Put some iodine sludge in a test tube. Cover it with about three times its bulk of water and pass in sulphuretted hydrogen which you can evolve from ferrous sulphide and hydrochloric or sulphuric acid. At first little happens, but when the sulphuretted hydrogen has been bubbling through for a few minutes, sulphur begins to be precipitated.

This is a sign that the sulphuretted hydrogen is beginning to give up its hydrogen to the iodine forming hydriodic acid. The hydriodic acid now dissolves iodine and the reaction proceeds more swiftly, more and more sulphur being precipitated and the iodine diminishing. When the solution loses the colour of iodine, the reaction is complete.

Now remove the sulphuretted hydrogen generator and pass a rapid stream of carbon dioxide into the solution to remove the excess sulphuretted hydrogen. When the solution has lost its putrid odour of the gas, filter it from the sulphur and bottle it.

If you test a little of it you will find it gives the usual iodide precipitates with lead, silver and mercuric salts. The acid is useful when we wish to prepare one of the uncommon insoluble iodides such as strontium iodide, for we need only dissolve strontium carbonate in the acid and evaporate the solution.

A very unusual reaction occurs if you add potassium iodide to copper sulphate, for instead of cupric iodide being formed, you get a yellow-brown mixed precipitate of cuprous iodide and iodine. Filter the solution and test it with starch paper. It becomes blue from free iodine in solution.

Cupric iodide is unknown, but to prepare pure cuprous iodide free from iodine, add sulphurous acid or ferrous sulphate to the copper sulphate before pouring in potassium iodide. A buff precipitate is now formed. Filter and wash it before drying and bottling.

Iodoform

Having roamed about in inorganic chemistry, let us finally step over into the organic field and prepare iodoform. Dissolve some iodine sludge in methylated spirit or acetone, warm it and add drop by drop sodium carbonate until the solution is decolourised.

On cooling, yellow crystals of iodoform will form, which you can purify by recrystallising from a little warm methylated spirit. Note the highly characteristic smell of iodoform. This substance is used in some surgical dressings, owing to its antiseptic properties. (283)

An Electric Door Lock

THIS lock can be fixed to any box or cupboard and it is sure that no one unaware of the secret of operation will be able to open the door. An ordinary knob or keyhole can be fixed up, but no amount of juggling with these will result in the door being opened. The bolt is on the inside, and there is only one way to withdraw it—momentarily to connect a battery to the two hinges, just visible where the door swings.

It is extremely unlikely anyone would think of this method of unlocking, if not told, and a battery from a torch or so on, can be used, contact being made with an open penknife or any other convenient means.

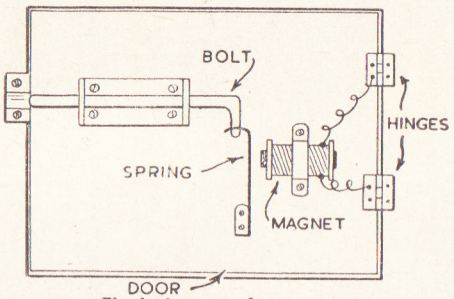


Fig. 1—Lay-out of parts

Arrangement of the Parts

Fig. 1 will make construction clear. The bolt may be an ordinary ready-made one, or can be fashioned by taking a length of very thick material (such as a very large nail) and bending the one end at an angle. The size and strength of the bolt will depend upon the size of the cupboard or box, and the importance of the materials kept inside.

The down-turned end of the bolt engages loosely in a hole in the top of the spring strip. When the magnet is energised, this strip is moved sharply to the right, withdrawing the bolt.

With most cupboards and boxes the hinges are fixed so that they are just visible on the outside when the door is shut. Two of the fixing screws are loosened and the ends of the magnet winding secured under the hinges.

Making the Parts

The detail (A) in Fig. 2 shows how the spring is cut. A piece from a tin-can is used and right-angle bends are made at the dotted lines. The large hole should provide an easy fit for the end of the bolt.

If the bolt is made up as suggested, it can slide in a guide cut out as shown at (B). The staple or loop into which the bolt passes when the door is locked, is shown at (C). Again, bends are made at the position of the dotted lines. For a small lock, all these parts can be cut from any thin metal.

For the magnet, shown at (D) (before winding) use a piece of iron or similar metal about ¼in. in diameter and 1in. to 1½ins. long. Fix two stout cardboard cheeks about ¾in. in diameter to this, and

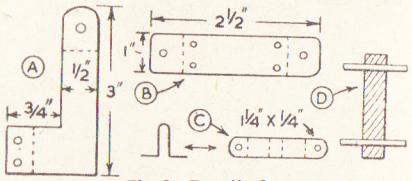


Fig. 2—Detail of parts

wind the bobbin thus formed full with 22 S.W.G. wire. Any kind of insulated wire is suitable. Bind the magnet with stout paper and fix it in position by means of a strip cut from tin and screwed down (see Fig. 1).

The space between the spring strip and end of the magnet should not be larger than necessary, so that the bolt can click back and forward sharply when the battery is connected.

The home handyman should be capable of FIXING GLAZED TILES

IT often happens that the glazed tiles surrounding a fireplace become cracked and unsightly. Likewise, tiles on the walls of the bathroom or scullery are often in need of replacement. These repairs can be carried out very cheaply and easily by the handyman. The more ambitious amateur can carry out the tiling of a room, and, if care is taken, the job can be made to look really well.

Where an odd tile is cracked it will have to be removed, and replaced with a tile of similar size and colour. The local builder's merchant or hardware store should be able to supply a replacement. To remove a tile, use an old penknife, and draw the point of it along the cement joining the tile to its neighbours.

Cleaning Up

Then, using an old wood chisel, chip the tile away from its cement bed a little at a time. Then chip away the old mortar bed or 'screed' as it is called, and renew this. Make the mortar of one part cement to three parts sand, but before applying it, be sure to wet the cavity thoroughly, or the mortar will not grip properly. Leave the new screed to dry for a day, then proceed to fix the new tile. First soak it in water for a few hours, then apply mortar, and tap it into position. Use a straight edge to ensure correct alignment with the other tiles.

Where many of the hearth tiles are cracked it is worth while replacing the whole of the tiles. In general, the instructions given here for tiling the walls of a room can be followed. Having retiled a hearth, however, do not light a fire in the grate for a week, so as to give the mortar a chance to set thoroughly.

Finding the Number

Sculleries and bathrooms are often tiled up to a height of 4ft., and the work is well within the scope of the average handyman. Tiles 6ins. square are commonly used for this purpose. To find the approximate number of tiles needed, find the total area in square feet of the wall surface you wish to tile, and multiply this figure by four. If you are using oblong tiles 6ins. by 3ins. you will need double the number. Tiles with one rounded edge are used for the topmost row, so the number of these required should be calculated.

Remove Plaster

Since mortar will not take effectively over plaster, the latter must first be removed from the area of wall which is to be tiled. First remove the skirting board by levering it away from the wall with a chisel and hammer.

Then draw a line round the walls at the required height, say, 4ft. Cut along the line with a chisel, and then chip away the plaster below the line. Remove every trace of the plaster from the wall, and brush away all debris.

The plaster must now be replaced with a layer of mortar of similar thickness. This layer is called the screed (Fig. 1). To make the mortar, thoroughly mix one part of cement to three parts sand, and add just sufficient water to make it workable, but not sloppy. Then the area of wall to be covered should be moistened by flicking water from a distemper brush. Do this carefully, paying attention to all cavities.

To apply the mortar you should use a square piece of board, to the back of which is nailed a wooden handle. Load this tool with mortar, and press it to the wall, spreading the mortar over the surface. Start at the bottom, and work upwards with a jerky movement. Smooth off with a trowel, checking that the surface is flat by using a long straight edge.

Key Scratches

The next stage is to cover the whole surface with a series of trowel marks—long lines, 1in. or 2ins. apart. These scratches will provide a surface for the final layer of mortar to cling to. Then leave the screed to dry for at least a day.

Fixing the tiles comes next. This job should not be rushed, as extra care spent in fixing each tile is well repaid by the better finish obtained. Soak the tiles in clean water for an hour or two before using. This will ensure that the mortar adheres to the tiles.

Start by laying the bottom row of tiles. Take the tile in the left hand, and spread it with mortar at least ¼in. thick. The mortar should be similar to that used for the screed. Press the tile into position on the wall with the aid of a trowel handle. The layer of mortar between the tiles and the screed should be ¼in. thick.

To ensure that the bottom layer of tiles is true, it is advisable to nail a thin piece of wood to the floor at a distance from the wall which is equal to the thickness of the tile and the mortar combined. Thus if the tiles are ¼in. thick, the wood should be exactly ½in. from the wall. Another piece of wood ½in. thick fixed above the top of the screed will enable a straight edge to be used for checking the alignment of the tiles.

Cutting Tiles

Any surplus mortar from one tile should be used for the next. Fix the tiles as close together as possible and try to get the spaces between them as nearly equal as you can. When you come to the end of the row, you will find that you only need probably half a tile.

To cut a tile, measure the length required exactly, and mark this off at the edges of the tile. Then, using a steel ruler as a guide, draw a glass cutter firmly along the glazed surface. Then break the tile along the cut by pressing it against the edge of a table.

Take special care with the fixing of this first row of tiles; if they are not satisfactory, remove them and begin again. You should plan your tiling so that the half tiles are used in an out-of-the-way position. Use the neater whole tiles at the entrance to the room, for example. Figs. 2 and 3 show the tile patterns obtained when using square and oblong tiles respectively.

Rounded Edges

As already mentioned, the topmost row of tiles should have rounded top edges. if you have used eight 6in. tiles on a 4ft. screed, the top edge will protrude a fraction of an inch above the top of the screed. A small space should be left at the top (see Fig. 1), so that alabastine filler can be inserted. This will produce a smooth, level surface.

When the tiling operation is finished, wipe the tiles clean of all mortar, then fill in the spaces between them with alabastine or plaster of paris. (328)

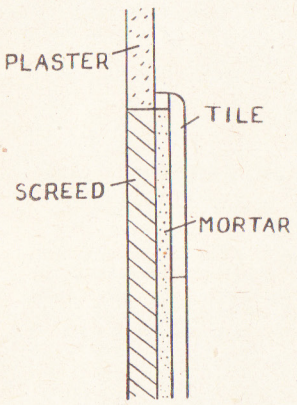


Fig. 1—Section of wall

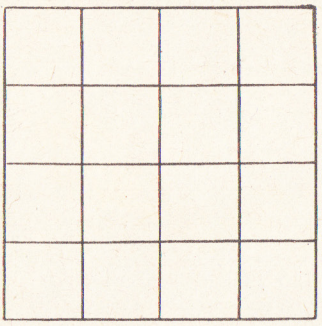


Fig. 2—A plain square type

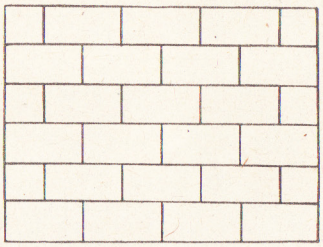


Fig. 3—Oblong type of tile

Get the best work by knowing the correct way of
USING A HANDSAW

AS we recently had an article on the making of a saw trestle (seen again in the accompanying photographs), a few hints on actual sawing will not come amiss, as some fellows make awfully hard work of it.

The top photograph shows how NOT to do it. The saw is almost upright and the amateur carpenter is holding it with both hands. He is unable to put any real 'push' into the work, and has not much control over it.

The photograph below shows the correct way. The arm, working like a piston, is in line with the saw, and this is held at a slope, neither too high nor too low. The teeth of the saw were designed, in fact, to cut most effectively in this position. Only one hand is being used and the forefinger lies along the handle, so as to 'steer' it.

The right attitude and angle for cutting

A man-size saw is being used for a man-size job, and as the saw is really *sharp*, work is quite easy. Saw setting requires either quite a knack if done with simple tools, or a special tool hardly likely to be found in amateurs' kits. But it does not cost a fortune to have a saw reset at a tool shop. To keep the edge in good condition, some workers have a simple device, such as illustrated in Fig. 1, or something on these lines, easily made in a few minutes. It is merely a couple of thin battens held at each end with bolts and wingnuts.

Different Saws

In theory (and in actual practice if a lot of sawing of heavy stuff is attempted), two different saws are needed, one for sawing with the grain and another for sawing across it, but in most kits of tools, a hand-saw about 26ins. long and with six teeth to the 1in., will be about right, and the teeth are usually a compromise for doing both kinds of cutting.

For a smaller boy tackling smaller stuff, a 24in. saw will be more suitable, with, say, eight teeth to the 1in. (known as a Panel Saw). It does not leave so many 'whiskers' as coarser saws. But, of course, you cannot saw up logs with it.

Whatever saw is bought, try to get the very best. It is, of course, a counsel of perfection, especially in these days of high prices. But a really good saw will literally last a life-time, whereas a cheap saw will soon blunt and lose its temper. Cheap tools are a false economy.

Points to Note

A good saw has the back thinner than the part at the teeth, i.e., it tapers off in thickness from teeth to back, thus preventing binding in the saw cut. A skew-back saw is said to be easier and lighter to handle.

In testing a saw, one grasps it by the handle (see that the handle is comfortable) and, holding the saw in a working position, test for balance. Squint along the cutting edge to test whether the teeth are in a perfectly straight line. Grasping the handle very firmly, take hold of the free end and bend it round in a wide arc. Let go of the end, and the blade, if not soft or of uneven temper, should spring back to its original position.

By letting the light fall on the blade from a certain angle, imperfections of hammering and grinding of the blade can be easily seen.

In Operation

The handle may be held in the left hand whilst the right forefinger is snapped against the thumb, so that it strikes the free end of the saw sharply. A clear ringing noise should be heard, without jarring (denoting uneven temper).

Handles that work loose after much hard wear can be excused, but some are loose when purchased. Hold the handle in both hands and waggle the blade up and down briskly. Any looseness should be apparent.

Needless to say, a five-shilling 'bargain(?)' saw is not likely to survive these tests.

When sawing, put the thumb of the free hand on the waste side of the saw line and using this as a guide, draw the saw upwards. This will make a groove large enough to guide the saw when it is pushed forward. The saw, of course, cuts properly only on the forward stroke.

A Correct Start

The secret of keeping to a line in sawing is to get the first strokes right, for if they go even a fraction astray, the error will increase with every stroke. The first few strokes should be short ones and then, when the saw is biting well, the length of the strokes are increased.

The wrong way of holding a saw

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Should the saw go off the line, bring the saw to a nearly vertical cutting position and sawing more slowly, twist the blade in the required direction on the down strokes.

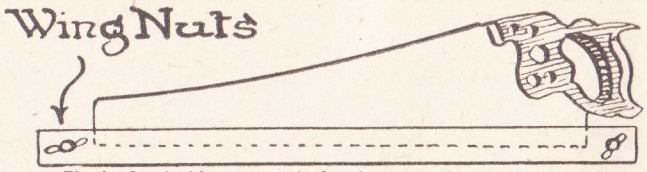

Fig. 1—A suitable cover strip for the teeth of a handsaw

Most of the full length of the blade should be used with good full strokes rather than small jabbing ones. Be careful, however, not to let the end of the saw catch in the wood, as then the saw might be buckled, especially if of poor temper, and this would then need special treatment from a saw grinder.

Wood under 2ft. long is best sawn upright in the vice, sawing half-way down and then reversing. Keep the wood low in the vice first.

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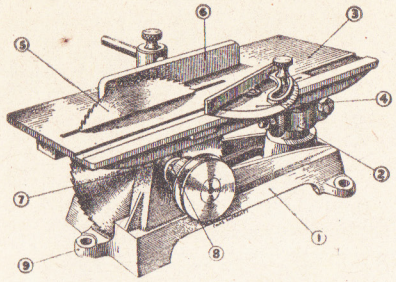

Note also that direction of saw now clockwise to take advantage of greater length of table and provide greater protection as saw now working behind the pillar supporting the table instead of in front of it.

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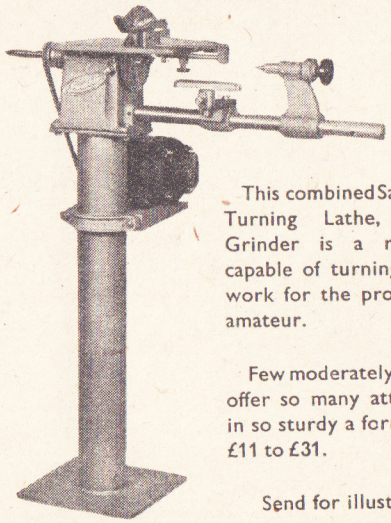

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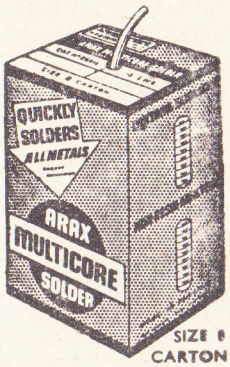

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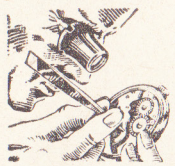

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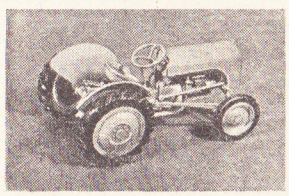

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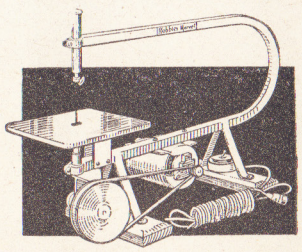

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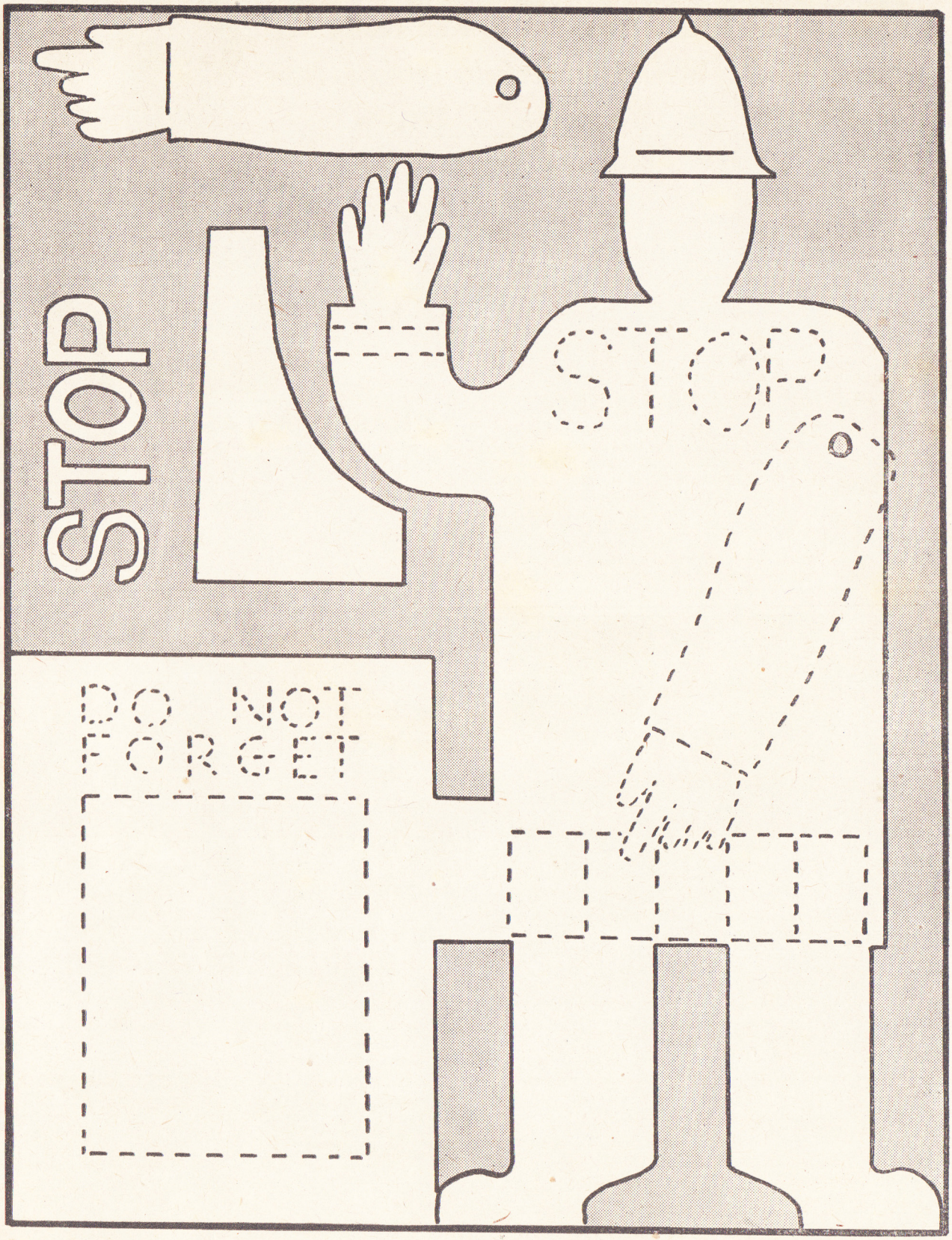

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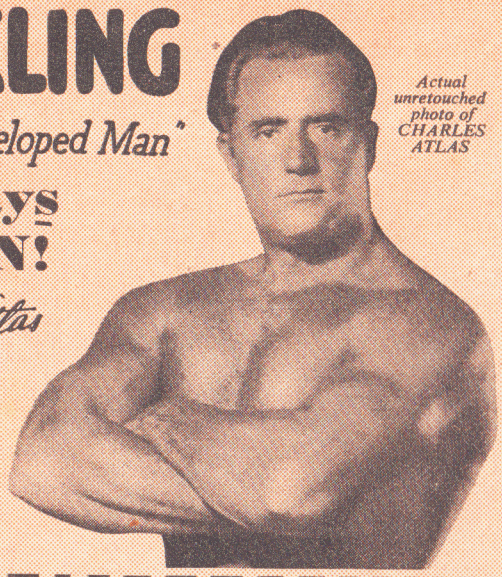

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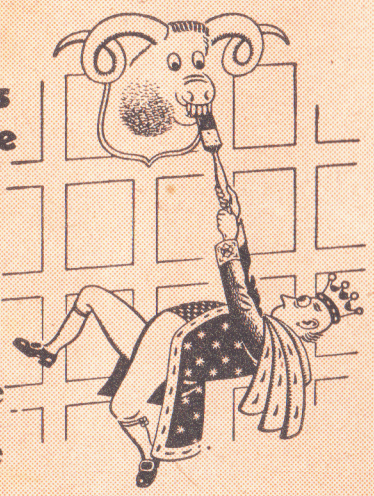

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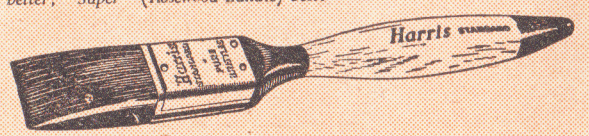

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